

## **DEVIATION # 2 - Ramp Terminal I/S Sight Distance**

**XL-1050      SR 00      MP 181.77 to 191.89**

### **Railroad Overcrossing to Adams County Line**

#### **Overview:**

This is an advanced engineering P1/I2 paver for the 2001-2003 biennium. The purpose of this project is to pave with ACP and to make safety improvements deemed necessary by the design matrix and current standards.

#### **Existing Conditions:**

SR 00 is a 4-lane NHS interstate highway in a rural area that has level to gently rolling terrain. The posted speed limit is 70 mph and the ADT is 9500 with a truck percentage of 21.

This section has three interchanges: Wheeler Road (Vic. MP 182.84), Raugust Road (Vic. MP 184.89), and Warden Road (Vic. MP 188.89). All have substandard sight distance at the off ramps. The speed limit on all the cross roads is 50 mph.

The existing sight distance at the ramp terminals is substandard in the following sections:

Section 1. Wheeler I/C EB Off-Ramp (C-Ramp) - The sight distance to the left at this ramp is approximately 850 feet. The sight distance is impeded by a bridge column for the I-00 overcrossing.

Section 2. Wheeler I/C WB Off-Ramp (E-Ramp) - The sight distance to the left at this ramp is approximately 535 feet. The sight distance is impeded by a bridge column for the I-00 overcrossing.

Section 3. Raugust I/C EB Off-Ramp (R2-Ramp) - The sight distance to the left at this ramp is approximately 695 feet. A crest vertical curve for the bridge over I-00 limits the sight distance at this intersection.

Section 4. Raugust I/C WB Off-Ramp (R3-Ramp) - The sight distance to the left at this ramp is approximately 350 feet. A crest vertical curve for the bridge over I-00 limits the sight distance at this intersection.

Section 5. Warden I/C EB Off-Ramp (C-Ramp) - The sight distance to the left at this ramp is approximately 370 feet. A crest vertical curve for the bridge over I-00 limits the sight distance at this intersection.

Section 6. Warden I/C WB Off-Ramp (B-Ramp) - The sight distance to the left at this ramp is approximately 530 feet. A crest vertical curve for the bridge over I-00 limits the sight distance at this intersection.

### **Deviation Description:**

The required sight distance to the left of each ramp terminal, based on a WB-50 design vehicle, varies with grade and is shown in table 1. These values were calculated using Design Manual Figures 910-16a-c. The sight distance looking left is substandard in 6 locations throughout the project limits due to bridge columns and vertical curves. The region proposes that the sight distance remain the same. Photos of the sight distance at each ramp have been attached. The sight distance to the right meets the 925 foot standard at each ramp terminal.

The stopping sight distances for a vehicle on the crossroad approaching each ramp at 50 mph are shown in table 1. These are from Design Manual figures 650-3 for grades less than 3% and 650-4 for steeper grades.

TABLE 1 -- SIGHT DISTANCE				
Ramp	Down Grade	Standard Intersection Sight Distance-Lt. (ft)	Existing Sight Distance Lt. (ft)	Stopping Sight Distance (ft)
Wheeler C	< 3%	875	850	395
Wheeler E	< 3%	875	535	395
Raugust R2	6%	1385	695	540
Raugust R3	< 3%	1240	350	395
Warden C	3%	1240	370	400
Warden B	3%	1240	530	400

This shows that a vehicle traveling 50 mph on the crossroad would be able to stop for a vehicle coming off of the Wheeler C, Wheeler E, Raugust R2, and Warden B ramps. The existing sight distances on the crossroad approaching the Raugust R3 and Warden C ramps would not allow a vehicle to come to a complete stop before reaching the ramp however, it would be able to slow in this distance and give the vehicle from the ramp more time to complete the turn.

### **Other Options**

One option for sections 1 and 2 would be replace the existing bridges with wider spanning columns. The estimated cost is one million dollars to replace both bridges thus removing the sight distance obstruction for the Wheeler C and E ramps.

An option for sections 3-6 would be to raise the profile of ramps and cross roads within the interchange to provide better sight distance over the crest vertical curve. The slopes from raised ramps would interfere with nearby frontage roads and would therefore require

the purchase of right of way and raising of the frontage roads. The cost estimates for each section are: Raugust EB off ramp - \$3.1 million, Raugust WB off ramp - \$642,000, Warden EB off ramp - \$840,000 and Warden WB off ramp - \$1.1 million.

### Accident History

From January 1995 through December 1999, there were five accidents that occurred near the ramp terminals. These accidents have been summarized in Table 2. Three of the accidents are single vehicle accidents, one was a rearend, and one was a vehicle hitting an out of control vehicle. None of these accidents are attributable to sight distance. An accident history has also been attached.

TABLE 2, RAMP TERMINAL ACCIDENTS							
Ramp	MP	Date	Road Surface	Accident Type	Severity	Number Injured	Impact Location
Wheeler C	182.84	2/21/1996	wet	Other object	possible inj.	1	Inc. off ramp
Wheeler E	182.84	2/21/1996	wet	Other object	evident inj.	1	Dec. off ramp
Raugust R2	184.89	8/29/1995	dry	rearend	no injury	0	Inc. off ramp
Raugust R4	184.89	2/19/1999	unknown	Hit out of control vehicle	no injury	0	Inc. on ramp
Warden D	188.91	11/14/1997	unknown	single vehicle	no injury	0	Inc. on ramp

### Recommendation:

Based on the accident history and the low benefit for the cost to bring the sight distance up to current standards, a deviation is requested to leave the existing sight distance as noted above.

\_\_\_\_\_  
Recommended By                      Date                      Regional Concurrence                      Date

\_\_\_\_\_  
OSC Approval                      Date